

TECHNICAL BULLETIN – TB039

SUBFLOOR PREPARATION – THE KEY TO SUCCESSFUL FLOORING INSTALLATIONS

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INTRODUCTION & SCOPE

One of the major issues that arises during the installation of a flooring system, either on a new substrate, or renovation of a pre-existing surface, is the preparation of the floor prior to the new flooring being put in place.

Due to pressures associated with construction schedules, or the perceived cost of the preparation, subfloor preparation is either not done or shortcuts are taken which can compromise the final performance of the floor system.

In this bulletin we will look at some of the results of sub-standard subfloor preparation.

WHAT THE EXPERTS SAY

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“Problems with blow-ups and failures leading to total flooring replacement are increasing at an alarming rate. Sadly, many installations, covering thousands of square metres and costing millions of dollars in labour and materials (not to mention the inconvenience to the client and the loss of reputation for the contractor) totally wasted in work that has to be re-done. Most of the problems are caused by incorrect or insufficient surface preparation of the substrate to accept coatings of levelling and smoothing compounds.”

“Apart from the obvious reasons – incorrect laying procedures, poor skill levels, adhesives, whether the substrate is concrete, timber, steel, ceramic tiles or terrazzo – most of the problems are caused by incorrect or insufficient surface preparation of the substrate to accept coatings of levelling and smoothing compounds and the fact this can lead to total replacements & big dollars”

Nothing much has changed with this advice in the 25 years since it was penned.

WHAT THE STANDARD SAYS

The 2012 version of the resilient flooring standard AS1884, makes the following recommendations about the need for subfloor preparation;

3.1.1.5 Surface preparation

When subfloor repairs form part of the resilient laying contract, all grooves, holes and other concave imperfections shall be filled with a suitable material and any ridges or protrusions likely to impair the subfloor surface shall also be removed by mechanical means to achieve the required surface quality (see Clause 3.1.1.4). Any filling or levelling materials used shall be allowed to dry before floor coverings are laid as per the manufacturers’ instructions.

1.3.15 Mechanical means

‘Mechanical means’ is the process of surface preparation performed by application of applied physical forces to the substrate surfaces to remove contamination. For the purposes of installations on concrete this refers to the use of diamond grinders, scarifiers and captive shot blasters. For smaller areas this can include chippers and nail gun type scabblers. When installations are to be performed on timber floors ‘mechanical means’ refers to floor sanders. Regardless of the means used the final process in a mechanical preparation is vacuum cleaning.

SOME ISSUES TO CONSIDER

Naturally, the correct type of priming and levelling systems has to be chosen to suit the particular substrate and finish required for different floor coverings.

Often great emphasis is placed on the surface preparation of the walls and timber panelling of the building before the final coating of paint is applied. Not just the walls, but the floor

coverings are also visible and decorative – although no one walks or drags heavy objects over the walls and ceilings. When it comes to the floor, which is expected to take all the abuse we can dish out, the importance of surface preparation and quality of levelling materials and tiles adhesive seems to take second place - ‘out of sight out of mind’, and this is often leading to failures.

We realise it is a lot harder for installers today – harder than it has ever been before. There are an enormous number of problems layers have to overcome, many of which are out of their control.

Demands on the installer are great- changing technology, time restraints, new & different concrete, water problems in the substrate and the demand for smoother floors, just to name a few. All of these problems can be resolved with the correct procedures.

Training facilities are available for both installers and retail sales staff, as well information on the increasing number of new products on the market developed to overcome problems. These products, such as moisture membranes and sophisticated priming and levelling systems, if used in accordance with the specifications, will save time and money.

CASE HISTORIES

The most common problem we see with preparation is basically failing to remove pre-existing contaminants from the floor. These typically include old adhesives, paving paints or surface treatments, and residues such as laitance, dust or dirt. The next most common problem is failure to apply a membrane over the subfloor prior to installation of the underlayment and final floor covering.

To illustrate some of the problems which can occur when preparation is not performed, a few case histories are worth looking at. In all the cases we will look at, the subfloor was not correctly prepared or had some other problem prior to installation of the flooring. All these jobs had to be removed and re-instated at the expense of the installers.

Case Study 1 - Moisture Problems

In this application the commercial vinyl was laid over a floor which had a rising damp problem. The floor was not checked initially for moisture levels and a moisture barrier was not installed.

The resulting rising moisture penetrated through the K15 leveller and was trapped beneath the vinyl, resulting in de-bonding and blistering.

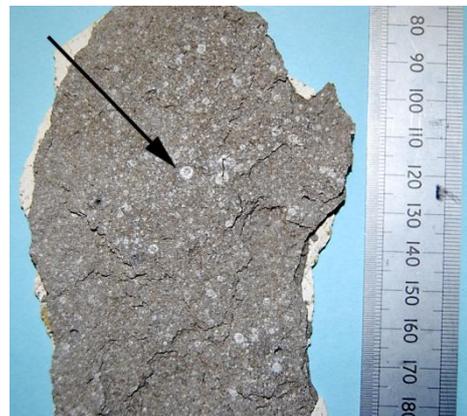
The entire installation had to be removed, moisture barrier installed, and underlayment and vinyl re-instated



Case Study 2 - Moisture Problems causes smoothing cement to decompose

Vinyl tiles were laid over below grade old concrete floor. Ardex A55 and Ardex WPM300 were used. After approximately 18 months the floors start to erupt in large spalled areas.

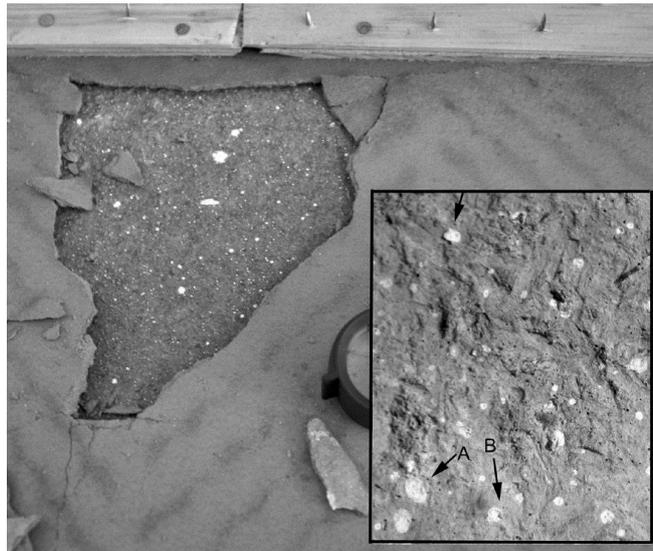
Investigation of the site indicated a problem with subfloor moisture due to; below grade slab, and leaking roof. The moisture barrier was applied thick enough to prevent progressive penetration of the water.



Case Study 3 – Surface contaminants and weak surface layer

A second storey renovation had a particle board floor installed which was to be overlain with carpet. The surface was flattened with Arditex. After approximately 6 years the customer noticed drummy spots under the carpet.

Investigation revealed that the subfloor was contaminated with building residue including paint or plaster (A-B). The particleboard has also been subject to water damage and the weak surface layer with the including water seal was not removed. The Arditex pulled this weak layer off the floor.



Case Study 4 – Poor surface preparation and thin moisture barrier

Smoothing cement with a coarse finish epoxy coat were applied over a smoothing cement on old terracotta tiles.

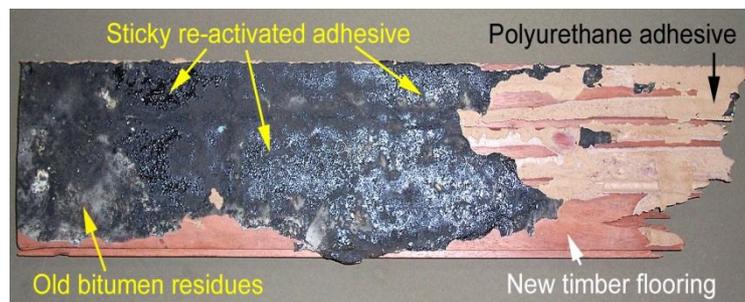
Investigation revealed that the moisture barrier was only ¼-½ of the required. The tiles also had a weak surface after grinding which de-bonded under the load the floor was subjected to. Irrespective, Ardex does not offer this system as a recommendation.



Case Study 5 – Old adhesive not removed

An old concrete floor had the vinyl removed but the old 'Black Jack' adhesive was left in place. A 1.5mm skim coat of Arditex was applied and then strip timber fixed with polyurethane adhesive. After a short time the floor de-bonded.

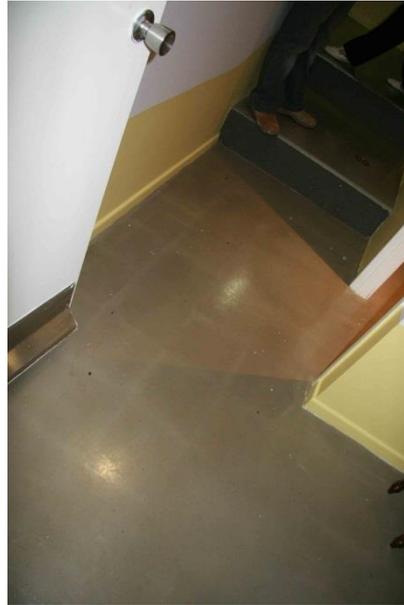
Analysis shows that the polyurethane adhesive contained aggressive solvents which penetrated through the wafer thin Arditex and reactivated the old adhesive which de-bonded off the floor.



Case Study 5 – ‘Feature floor’ applied over existing tiles

A existing tiled floor in a restaurant was over coated with Ardex P82 then Ardex K12 and a sealer. The grout lines developed show through.

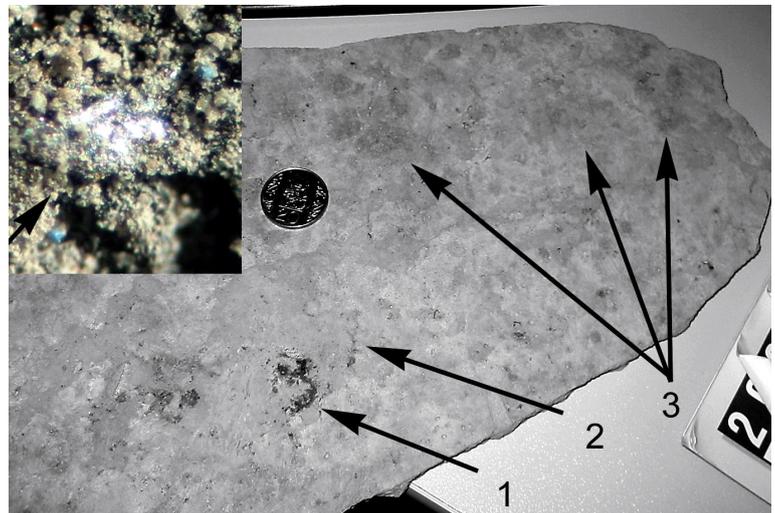
There was no real need to investigate this complaint as it was a non-recommended application. It occurs because the porosity differences between the grout and tiles. A similar problem can result from Feather Finish over tiles before vinyl flooring, when not enough Feather Finish is applied.



Case Study 6 – Oils and metallic residues on floor

An old aluminium foundry was floor to be used as a sporting complex was flood coated with Arditec. Sections of the floor subsequently de-bonded.

Examination of the Arditec revealed the presence of several contaminants including oil (1), old weak surface concrete (3) and metal slag (2-inset picture). These indicated the floor had not been mechanical prepared and cleaned



Case Study 7 – High strength concrete, moving slab and too thick product

Concrete floors in a multi-level building were smoothed up to 30mm with Ardex K12, and then cracked and de-bonded.

Examination of the floor showed it to be ground, but the topping only cracked above 12mm thick and around the building perimeter. Complex investigation revealed the slab to be post tensioned and off specialised design leading to high strains. Also the concrete was of unusual mix design. E25 polymer modified K12, and normal K15 did not crack.

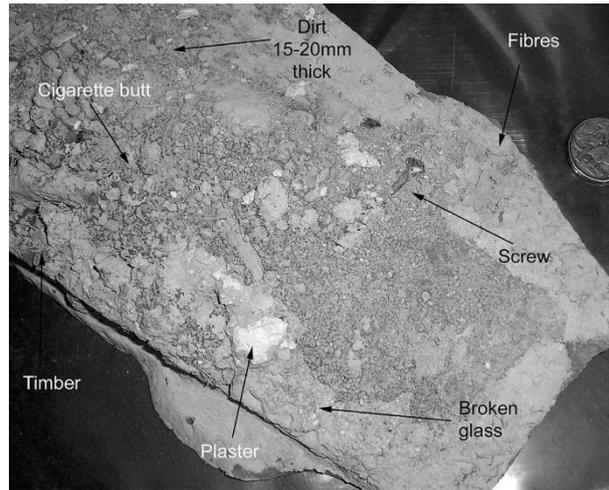


Case Study 8 – Extreme subfloor contamination.

This sample was one of the worst seen by Ardex to date.

A concrete floor has been 'filled' and 'smoothed' for tiling. Subsequently the topping cracked up and de-bonded.

The reality was that the installer had swept the building residues on the floor into the floor's low spots, and then poured 15-20mm of smoothing cement over the top!!! No attempt had been made to clean the floor at all.



ARDEX Technical Services is available to discuss subfloor problems with your clients and explain to them the difficulties the installer will face if the floor is not laid correctly. We will also explain the costs of cutting corners – and the fact this can lead to total replacements and big dollars.

There is no magic cure for the problems floor layers experience, including the pressures put on them by the end user and the state of the industry at the moment. It is disappointing to see the installer running the gauntlet and cutting corners to get a job.

The industry is experiencing one of the worst periods in its history at the moment, with each sector of the market blaming the other for its problems. We see a lot of jobs and talk to all areas of the industry – too often the horse has bolted. Most of the problems we investigate, and all the money that is spent on rectifications, could have been avoided with very little extra effort and money in the first place when the job is commenced.

Typically the costs to replace a faulty installation often exceed 3 times the original placement cost, and in a recent industry survey it was estimated that it would take the profit from the next 30 projects to pay for 1 faulty installation (based on an average 100 m² project).

It is amazing that for an initial saving of a few hundred dollars, people are prepared to use cheap alternatives and risk the loss of thousands of dollars in pull-ups.

For further information contact Ardex and speak to Technical Services about issues you may have with a floor.

IMPORTANT

This Technical Bulletin provides guideline information only and is not intended to be interpreted as a general specification for the application/installation of the products described. Since each project potentially differs in exposure/condition specific recommendations may vary from the information contained herein. For recommendations for specific applications/installations contact your nearest Ardex Australia Office.

DISCLAIMER

The information presented in this Technical Bulletin is to the best of our knowledge true and accurate. No warranty is implied or given as to its completeness or accuracy in describing the performance or suitability of a product for a particular application. Users are asked to check that the literature in their possession is the latest issue.

REASON FOR REVISION

24 month review. Two minor text changes.

REVIEW PERIOD

36 months from issue.

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